Ministry of Higher Education and
Scientific Research
University of Technology
Computer SciencesDepartement
Final Term 2013-2014

Date:
Time: 3 hours
Lecturer: aKbas E. & Iman Sh.

Subject: discrete math
Class: first
Branch: all branch

Note : **Answer (6) questions only ,10 marks for each**

Q1: Prove by induction

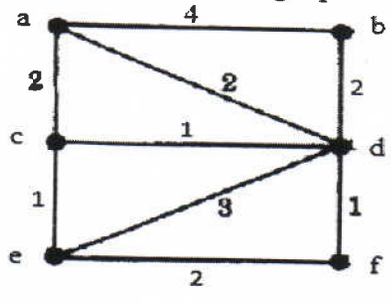
$$1 + (1 + 2 + 3 + \ldots + n) = 1 + \frac{n(n+1)}{2}.$$

Q2) In a survey of 25 people, it was found that:
15 read Newsweek magazine, 5 read both Newsweek and Time,
12 read Time, 9 read both Newsweek and Fortune,
11 read Fortune, 4 read both Time and Fortune,
3 read all three magazines.
(a) Fill in the correct number of people in each of the eight regions of the Venn diagram

Q3) Answer only one of the following:----
(A) Consider the algebraic expression: **(8- (2*3))+((6-1)-(3+1))**
1- Rewrite the expression into prefix polish notation form. .
2- Construct the corresponding ORT
3- Evaluate the value of this expression

(B) Construct FA with input symbols = (a,b), which will only accepts those words which begin with "**a**" followed by (zero or more) "**b**'s".(i.e.: the accepted words are: a, ab, abb, …)

Q4) Find minimal spanning tree for the weighted graph using kruskal algorithm



Q5) Sketch the graph of the function: **$g(x) = X^3 - 3X^2 - x + 3$**
Is g(x) : 1) One-to-one 2) Onto? 3) Invertible? (Mention the reason)

Q6) Consider the relation R = {(1, 4), (2, 1), (2, 4), (3, 2), (3, 4), (4, 3)} on the set

A = {1,2,3,4},.Find: (1) reflexive(R); (2) symmetric(R); (3) transitive(R).

Q7) Q4 :Prove the following argument is valid : $p \rightarrow q,\ q \rightarrow r,\ \vdash\ p \rightarrow r$?